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Foliar Fungicides in Alfalfa Production

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Abstract
To initiate efforts addressing the use of foliar fungicides in alfalfa production, we conducted eight site years of research trials from 2011 to 2013 at the ISU Northeast Research Farm, Nashua, Iowa. Although additional research is needed, the purpose of this report is to provide preliminary information.

Disciplines
Agricultural Science | Agriculture

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Introduction

To initiate efforts addressing the use of foliar fungicides in alfalfa production, we conducted eight site years of research trials from 2011 to 2013 at the ISU Northeast Research Farm, Nashua, Iowa. Although additional research is needed, the purpose of this report is to provide preliminary information.

Materials and Methods

Four trial sites of alfalfa were direct seeded with a Brillion seeder in 2011 and 2012, on land previously in soybeans. The research trials included two during stand establishment in 2011 and 2012, and six on established stands in 2012 and 2013. The trials had four or six replications in a randomized complete block design.

Treatments in the various trials included: (1) timing of fungicide applications made at either 3 to 4, or 6 to 8 in. of growth, (2) comparison of two varieties, (3) fungicide applications prior to first or second crop for new seedings, and prior to first, second, third, or fourth crop for established stands. A few treatments consisted of multiple applications per season, and (4) comparison of fungicide products Headline SC (Group 11), Quadris Flowable (Group 11), Fontelis (Group 7), and Champ WG copper hydroxide (Group M).

Plots were evaluated for disease prior to each harvest. Plots were harvested with a small-plot flail chopper. For some trials, composite subsamples were analyzed for forage quality.

Seasonal temperatures and rainfall were near normal from the spring of 2011 through May 2012, after which temperatures were above normal and rainfall was 50 percent below normal causing a drought throughout the rest of 2012. In 2013, temperature and rainfall was above normal in spring, then cooler and drier than normal for the rest of the season.

Results and Discussion

New seedings. Only Headline SC was used in the new seeding trials. Disease incidence was similar for first and second crop in 2011 and for first crop in 2012, but was notably higher in second crop in 2012. Second crop in both years yielded better than first crop, which is typical for direct seeded stands. The net profitability for a fungicide application was considerably better when applied before the second crop rather than before the first crop. It is logical to assume that disease presence and its potential impact on a crop would not be as high for first crop because the new seeding is established on land rotated from a different crop. By second crop, more alfalfa leaf litter on the ground is likely to act as an inoculum source to potentially contribute to disease infestations. Net profit was minimal for a fungicide application ahead of first crop, but for second crop it averaged $21/acre for Variety 2 and $5/acre for Variety 1. It is reasonable to expect some varieties to respond differently to fungicide applications, however, it is unreasonable to expect the industry to screen varieties for this potential difference. Forage quality analysis was similar between the untreated control and the fungicide treatments.

Established stands comparing two varieties. These trials with Headline SC compared two varieties, the 3 to 4-in. vs. 6 to 8-in. growth heights and applications before the first, second, third, or fourth crops. In both 2011 and 2012, disease pressure for the untreated control was significantly higher for first crop harvest than for second, third, or fourth crop

harvests. Percent yield response of a fungicide application before the first crop harvest for both varieties and both years was approximately twice that of yield responses to applications before the other harvests. In turn, net profitability was best for applications before the first crop harvest, with an average of $24 and $44/acre for Variety 1 and 2, respectively. A fungicide also was applied before both first and third crops. This increased net profit compared with the single application before the first crop for Variety 2 in 2013, but profitability was the same as for a single application before the first crop for Variety 2 in 2012 and for Variety 1 in either year. Average net profit from applications before the second, third, and fourth crops for 2012 were $3, $3, and -$1/acre, respectively, and for 2013 were $11, $2, and -$1/acre, respectively.

Timing of fungicide applications at 3 to 4 or 6 to 8 in. of growth were compared with second crop in 2012 and third crop in 2013. In 2012, there was no difference with the timing of applications with regard to disease infestation or yield response for either variety. In 2013, there was a small advantage in yield response for the 6 to 8-in. timing. However, an application at 6 to 8 in. of growth ahead of second, third, or fourth crop harvests, followed by the required 14 day pre-harvest Interval (PHI), often will result in fields starting to flower before the PHI is reached. This is not a problem with applications at 6 to 8 in. of growth ahead of first crop harvest.

Composite subsamples from all treatments were analyzed for forage quality. As with the new seeding trials in the established stand trials, the forage quality analysis showed little difference between the untreated control and the fungicide treatments.

Comparing Headline SC, Quadris, and Champ WG. Another trial conducted in both 2012 and 2013 compared Headline SC, Quadris, and Champ WG. In 2012, applications were made ahead of second, third, and fourth crop. In 2013, applications were made ahead of first, second, and third crop. Two varieties were compared in 2012, but only one variety was used in 2013. The drought in 2012 significantly affected this trial. In 2012, Headline SC, Quadris and Champ averaged a net loss of $16, $15, and $37/acre, respectively, for the season. In 2013, with a wet spring, net profits for applications ahead of first crop averaged $74, $68, and $24/acre for Headline SC, Quadris, and Champ, respectively. Net profits for applications ahead of both second and third crops averaged $7, $8, and -$28/acre for Headline SC, Quadris, and Champ, respectively.

Comparing Headline SC and Fontelis. This trial encompasses one year and one location, so we must be cautious of overstating any conclusions. In general, Headline offered somewhat better protection and a higher economic return than Fontelis for first crop, but was similar in protection and economic returns for second and third crops. Thus, it offers a different chemical family to use in rotation when applying more than one fungicide application during the season.

Stewardship. Blindly applying fungicide on alfalfa three times a season is poor economics and poor stewardship. Consider probabilities of economic returns in the decision of when and how often a fungicide is used. If multiple applications per season are made, consider rotating fungicide groups. Good stewardship is critical for the long-term viability of this management tool.

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